

WHAT IS CLAIMED IS:

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A communications earpiece, comprising:

a member shaped to fit within an ear canal, the member having a passageway extending therethrough; and

a filter communicating with the passageway, the filter having a passageway extending therethrough and being aligned with the passageway in the member, the passageway in the filter having at least a portion which is narrower than the passageway in the member.

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2. The communications earpiece as claimed in claim 1, wherein the passageway in the filter has a first section and a second section, the second section being narrower than the first section and narrower than the passageway in the member.

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3. The communications earpiece as claimed in claim 2, wherein the first section of the passageway in the filter is narrower than the passageway in the member.

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4. The communications earpiece as claimed in claim 3, wherein the member has an inner end which extends furthest into the ear canal, the second section of the passageway in the filter being closer to the inner end of the member than the first section of the passageway in the filter.

5. The communications earpiece as claimed in claim 4, including a frusto-conical section between the first section and the second section of the passageway.

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6. The communications earpiece as claimed in claim 5, wherein the frusto-conical section has sides at a  $30^\circ$  angle.
7. The communications earpiece as claimed in claim 4, wherein the earpiece includes a connector for connecting an acoustical conduit to the earpiece, the filter being between the connector and the passageway in the member.
8. The communications earpiece as claimed in claim 7, wherein the member has an internal cavity communicating with the passageway therethrough, a filter housing being within the cavity, the filter being within the housing and the connector being connected to the housing.
9. The communications earpiece as claimed in claim 8, wherein the filter housing and the cavity are conical.
10. The communications earpiece as claimed in claim 4, wherein the second section of the passageway of the filter is between 0.15 mm and 0.5 mm in cross-sectional extent.
11. The communications earpiece as claimed in claim 4, wherein the second section of the passageway of the filter is 0.34 mm in cross-sectional extent.
12. The communications earpiece as claimed in claim 10, wherein the first section of the passageway of the filter is between 0.5 mm and 1.2 mm in cross-sectional extent.
13. The communications earpiece as claimed in claim 12, wherein the passageway in the member is between 0.5 mm and 2 mm in cross-sectional extent.

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14. The communications earpiece as claimed in claim 13, wherein the passageway in the member is 2 mm in cross-sectional extent.

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15. The communications earpiece as claimed in claim 4, wherein the passageway in the filter is 4 mm to 10 mm long.

16. The communications earpiece as claimed in claim 4, wherein the first section of the passageway in the filter is 1.5 mm to 3.5 mm long.

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17. The communications earpiece as claimed in claim 4, wherein the first section of the passageway is 3.3 mm long.

18. The communications earpiece as claimed in claim 4, wherein the second section of the passageway in the filter is 1.5 mm to 3.5 mm long.

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19. The communications earpiece as claimed in claim 4, wherein the second section of the passageway in the filter is 2.5 mm long.

20. The communications earpiece as claimed in claim 1, wherein the member is of silicone.

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21. A communications device comprising:

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a communications earpiece having a member shaped to fit within an ear canal, the member having a passageway extending therethrough, and a filter communicating with the passageway, the filter having a passageway extending therethrough and being aligned with the passageway in the member, the passageway in the filter having at least a portion which is narrower than the passageway in the member;

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an acoustical conduit connected to the earpiece;

an acoustical chamber member connected to the acoustical conduit;

5 a miniature speaker connected to the acoustical chamber member; and

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a plug connected to the miniature speaker for connecting the communications device to a radio.

10 22. The communications device as claimed in claim 21, wherein the acoustical conduit is a flexible tube.

15 23. The communications device as claimed in claim 22, wherein the passageway in the filter has a first section and a second section, the second section being narrower than the first section and narrower than the passageway in the member.

24. The communications device as claimed in claim 23, including a frusto-conical section between the first section and the second section of the passageway.

20 25. The communications device as claimed in claim 24, wherein the frusto-conical section has sides at a 30° angle.

26. The communications device as claimed in claim 23, wherein the first section of the passageway in the filter is narrower than the passageway in the member.

25 27. The communications device as claimed in claim 26, wherein the member has an inner end which extends furthest into the ear canal, the second section of the passageway in the filter being closer to the inner end of the member than the first section of the passageway in the filter.

28. The communications device as claimed in claim 27, wherein the earpiece includes a connector for connecting an acoustical conduit to the earpiece, the filter being between the connector and the passageway in the member.
29. The communications device as claimed in claim 28, wherein the member has an internal cavity communicating with the passageway therethrough, a filter housing being within the cavity, the filter being within the housing and the connector being connected to the housing.
30. The communications device as claimed in claim 29, wherein the filter housing and the cavity are conical.
31. The communications device as claimed in claim 27, wherein the second section of the passageway of the filter is between 0.15 mm and 0.5 mm in cross-sectional extent.
32. The communications device as claimed in claim 27, wherein the second section of the passageway of the filter is 0.34 mm in cross-sectional extent.
33. The communications device as claimed in claim 23, wherein the first section of the passageway of the filter is between 0.5 mm and 1.2 mm in cross-sectional extent.
34. The communications device as claimed in claim 33, wherein the passageway in the member is between 0.5 mm and 2 mm in cross-sectional extent.
35. The communications device as claimed in claim 34, wherein the passageway in the member is 2 mm in cross-sectional extent.

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36. The communications device as claimed in claim 27, wherein the passageway in the filter is 4 mm to 10 mm long.
37. The communications device as claimed in claim 27, wherein the first section of the passageway in the filter is 1.5 mm to 3.5 mm long.
38. The communications device as claimed in claim 27, wherein the first section of the passageway is 3.3 mm long.
39. The communications device as claimed in claim 27, wherein the second section of the passageway in the filter is 1.5 mm to 3.5 mm long.
40. The communications device as claimed in claim 27, wherein the second section of the passageway in the filter is 2.5 mm long.
41. The communications device as claimed in claim 22, wherein the member is of silicone.
42. The communications device as claimed in claim 28, wherein the connector has a cross-sectional extent equal to the passageway in the member.
43. A method of attenuating acoustical signals in a communications earpiece having a member shaped to fit within an ear canal, the member having a passageway extending therethrough, the method comprising placing a restriction in the earpiece which is substantially narrower than the passageway and which communicates with the passageway.
44. The method as claimed in claim 43, wherein the passageway in the member is made between 0.5 mm and 2 mm in cross-sectional extent and the restriction has at least

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a portion thereof which is made between 0.15 mm and 0.5 mm in cross-sectional extent.

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45. The method as claimed in claim 44, wherein the restriction has another portion which is made between 0.5 mm and 1.2 mm in cross-sectional extent.

46. The method as claimed in claim 45, wherein said at least a portion of the restriction is made 1.5 mm to 3.5 mm long and said another portion of the restriction is made 1.5 to 3.5 mm long.

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47. The method as claimed in claim 43, wherein the passageway in the member is made between 0.5 mm and 2 mm in cross-sectional extent and the restriction has at least a portion thereof which is made 0.34 mm in cross-sectional extent.

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48. The method as claimed in claim 44, wherein the restriction has another portion which is made 0.89 mm in cross-sectional extent.

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49. The method as claimed in claim 45, wherein said at least a portion of the restriction is made 2.5 mm long and said another portion of the restriction is made 3.3 mm long.

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